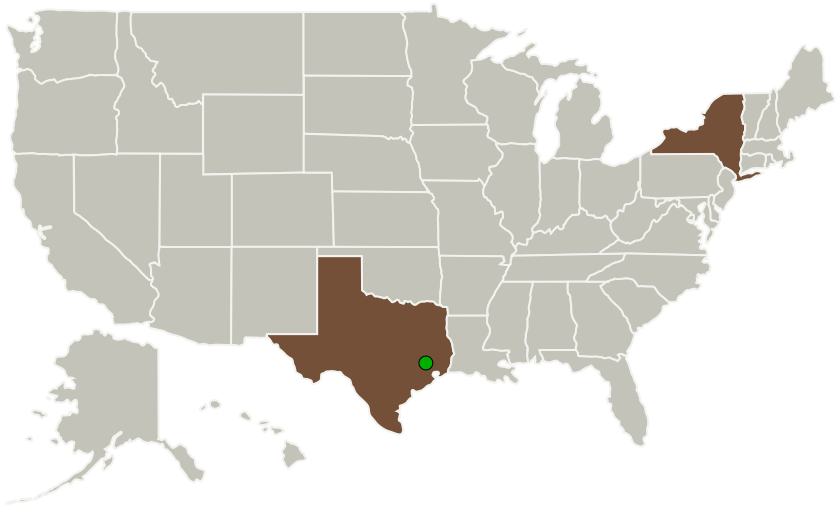
Mobile In-Situ Mars Water Extractor (MISME), Phase I

Completed Technology Project (2012 - 2012)

Project Introduction

Extracting water and volatiles from icy soils requires excavating and manipulating those soils as feedstock, but the Phoenix mission demonstrated some of the difficulties that may be encountered during such operations. The solution to these problems is an integrated mobile mining and water extraction system that uses an auger based excavation approach and an integrated water-ice extraction plant – hence, if the water-ice does sublime, it will sublime straight into the extraction system. The proposed system is an auger with a reactor and the weak link, the transfer system, is eliminated altogether. The system, called the Mobile In-Situ Mars Water Extractor (MISME), consists of the Icy-Soil Acquisition and Delivery System (ISADS), and the Volatiles Extraction and Capture System (VECS). The ISADS is a deep fluted auger that drills into the ice or icy-soils and retains material on its flutes. Upon material acquisition, the ISADS is retracted into VECS and sealed. The VECS consists of a cylindrical heat exchanger and volatiles transfer system (a reactor). This Phase I effort will focus on developing the water extraction reactor: Volatile Extraction and Capture System (VECS).

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Honeybee Robotics, Ltd.	Lead Organization	Industry	Pasadena, California
Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations	
New York	Texas

Project Transitions

February 2012: Project Start

August 2012: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138314)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Honeybee Robotics, Ltd.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Kris Zacny

Co-Investigator:

Kris Zacny

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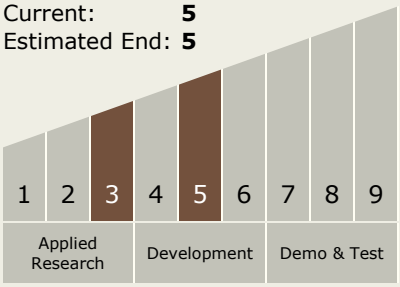
Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



Technology Areas

Primary:

- TX07 Exploration Destination Systems
  - TX07.1 In-Situ Resource Utilization
    - TX07.1.2 Resource Acquisition, Isolation, and Preparation

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System